

**REMARKS**

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-23 are pending. Claims 1 and 13 are amended. Claims 1 and 13 are independent.

Reconsideration of this application, as amended, is respectfully requested.

**Reasons for Entry of Amendments**

At the outset, it is respectfully requested that this Amendment be entered into the Official File in view of the fact that the amendments to the claims automatically place the application in condition for allowance.

In the alternative, if the Examiner does not agree that this application is in condition for allowance, it is respectfully requested that this Amendment be entered for the purpose of appeal. This Amendment was not presented at an earlier date in view of the fact that Applicants did not fully appreciate the Examiner's position until the Final Office Action was reviewed.

**Allowable Subject Matter**

Applicants appreciate the indication of allowable subject matter. However, claims 3, 4, 6-9, 12, 14, 15, 17-20, and 23 have not been rewritten in independent form at this time since, as discussed below, it is believed that

independent claims 1 and 13 (as amended herein) from which they depend are allowable.

**Drawings**

The formal drawings filed with the present application are accepted. The Examiner is courteously requested to provide a Notice of Draftsperson's Patent Drawing Review, Form PTO-948, confirming approval of the formal drawings, with the next official communication.

**Rejections under 35 U.S.C. §102 and 103**

Claims 1, 2, 10, and 11 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,469,444 to Leng et al. Claims 13, 21, and 22 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,834,895 to Dolan et al. Claims 5, 13, and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Leng et al. in view of U.S. Patent No. 3,867,665 to Furmidge et al.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance the prosecution of the present application, independent claim 1 is amended herein to recite a combination of elements in a metal halogen electrodeless illumination lamp including a discharge bulb containing a fill mixture with a main component of metal halogens which emits visible optical radiation featuring a molecular spectrum, immediately when excited with a

high frequency discharge, and an inert gas, of which said main component of said fill mixture of metal halogens includes halides of Sn and Al.

Likewise, independent claim 13 is amended to recite a combination of elements in a metal halogen electrodeless illumination lamp including a discharge bulb containing a fill mixture with a main component of metal halogens which emits visible optical radiation featuring a molecular spectrum, immediately when excited with a high frequency discharge, and an inert gas, of which said main component of said fill mixture of metal halogens includes bismuth halide.

Support for the main component of said fill mixture of metal halogens including metal halides of Sn and Al or bismuth halide can be found in the specification, for example, on page 6, lines 13-19 which recites:

“The metal halogen electrodeless illumination lamp of the present invention is featured in that the mixture of metal halogens contains halides of Sn and Al. In a particular embodiment of the present invention, the mixture of metal halogens contains  $\text{SnBr}_2$  and  $\text{AlI}_3$ . In a different embodiment of the present invention, the mixture of metal halogens contains  $\text{SnI}_2$  and  $\text{AlBr}_3$ .

Also, the mixture of metal halogens additionally contains bismuth (Bi) halide. In a specific embodiment, the Bi halide is  $\text{BiI}_3$ .”

and on page 8, lines 10-14, which recites:

“As a bulb fill substance providing emission of visible optical radiation having a molecular spectrum, it is possible to use a mixture of Sn and Al halides, or a Bi halide, or a mixture of thereof. The amount of a fill substance has to be such that it would

allow to maintain the gas vapors pressure in the range of 1~20 atm at working temperature of the lamp.”

It is respectfully submitted that the combinations of elements set forth in independent claims 1 and 13 are not anticipated or rendered obvious by the prior art of record, including Leng et al., Dolan et al., and Furmidge et al.

In contrast to Applicants' claimed invention, Leng et al. merely discloses a lamp that includes a metallic cylindrical member 6, a metallic mesh 8, a spherical bulb 10, a stem 12, a motor 14, a magnetron 16, and a waveguide 18, as shown in FIG. 1. The metallic cylindrical member 6 and metallic mesh 8 are contained in a microwave cavity. The mesh 8 allows light to escape from the microwave cavity while retaining the microwave energy inside, and the spherical bulb 10 is disposed in the microwave cavity and supported by the stem 12.

In discussing the related art, Leng et al. states that the color rendering index (CRI) for a sulfur lamp is about 80, whereas the CRI for a metal halides lamp is of about 70, and that a lamp with a CRI greater than or equal to about 90 would be considered a high quality color rendering lamp (column 1, lines 31-37). Any attempt to increase the CRI, however, is limited by the full width of half maximum (FWHM) of the visible spectrum of the lamps. In other words, an increase in red radiation results in a loss of blue radiation, thereby lowering the CRI. Blue or green radiation cannot be substantially increased by

introducing metal halides into sulfur plasma, because sulfur molecules have strong self absorption in those regions (column 1, lines 56-62).

Thus, Leng et al. uses calcium and/or strontium halide as an additive to the fill of a sulfur, selenium, and/or tellurium lamp to improve the color rendering index. Leng et al. also discloses that a small amount of metal halide may be added to the fill to increase the vapor pressure of the calcium or strontium halide. By contrast, the claimed invention uses metal halides (Sn and Al) as the main component (not as a volatilizer) and, as shown in the Examples of the present application, yields a CRI of about 90. Thus, Leng et al. fails to disclose the present invention.

Dolan et al. discloses a lamp 2, which includes a bulb 3, a conductive housing 4, a mesh 5, a magnetron 6, a waveguide 7, and coupling slot 8, as shown in FIG. 1. Bulb 3 contains a high-pressure fill and is supported in a microwave cavity which comprises the conductive housing 4 and mesh 5.

Dolan et al. discloses using a small amount of bismuth as an additive in the fill to augment illumination of the lamp in various regions of the spectrum. This reference is the patent which issued from a continuation-in-part of U.S. Patent 5,404,076, which corresponds to the related art discussed in Leng et al. Not surprisingly then, low CRI is also a problem in Dolan et al.

Leng et al. and Dolan et al. disclose a metal halogen electrodeless illumination lamp including a lamp envelope in which sulfur or selenium is

filled as a main component of a fill material. By contrast, the main component of the fill material in the claimed invention is tin (Sn) and aluminum (Al) or bismuth (Bi). Accordingly, the cited references and the claimed invention use different materials for the fill in an envelope.

Neither Leng et al. nor Dolan et al. teaches or suggests a discharge bulb containing a fill mixture with a main component of metal halogens which emits visible optical radiation featuring a molecular spectrum, immediately when excited with a high frequency discharge, and an inert gas, of which the main component of the fill mixture of metal halogens includes halides of Sn and Al, as recited in independent claim 1.

In addition, neither Leng et al. nor Dolan et al. teaches or suggests a discharge bulb containing a fill mixture with a main component of metal halogens which emits visible optical radiation featuring a molecular spectrum, immediately when excited with a high frequency discharge, and an inert gas, of which said main component of the fill mixture of metal halogens includes bismuth halide, as recited in independent claim 13.

In view of the foregoing, it is respectfully submitted that independent claims 1 and 13 patentably distinguish over the cited art, and reconsideration and withdrawal of the rejections under 35 U.S.C. §102(b), §102(e), and §103(a) are requested.

Independent claims 1 and 13 are in condition for allowance. Since the remaining claims depend directly or indirectly from allowable independent claims, they should also be allowable for at least the reasons set forth above, as well as for the additional limitations provided by these claims. Therefore, all claims should be in condition for allowance.

**CONCLUSION**

All of the stated ground of rejection has been properly traversed, accommodated, or rendered moot. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.

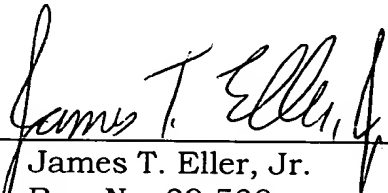
However, if there are any outstanding issues, the Examiner is invited to telephone Carl T. Thomsen, Reg. No. 50,786, at (703) 205-8000 in an effort to expedite prosecution.


If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit

Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

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